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To: Assistant Commissioner for Patents
Washington, D.C. 20231

Sir: Transmitted herewith for filing is the patent application of:

Inventor: T. FUJIYAMA et al (See Attached List)

For:
METHOD AND APPARATUS FOR EVALUATING SECURITY AND
METHOD AND APPARATUS FOR SUPPORTING THE MAKING OF
SECURITY COUNTERMEASURE

Enclosed are:

- ☒ 21 Sheets of Drawings
- ☒ This application is being filed without an executed Declaration.
- ☒ Priority is claimed from Japanese Application No. 11-277265
filed September 29, 1999. ☒ A certified copy is attached herewith.
- ☒ Copies of the disclosure documents listed on the attached PTO 1449 form and
☒ discussed in the specification or ☐ attached Information Disclosure Statement.
- ☐ A verified statement to establish small entity status under 37 CFR 1.9 and 1.27.
- ☒ Specification: Abstract X, Description 47 pages; and 16 claim(s).
- ☐ Preliminary Amendment.
- ☐ Executed Declaration.

The filing fee is calculated as shown below:

For:	No. Filed	No. Extra
Basic Fee		
Total Claims	16 - 20 =	* 0
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<input type="checkbox"/> Multiple Dependent Claim (s)		

* If difference is less than zero
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Small Entity

Rate	Fee
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x 9	\$
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	\$ 690
x 18	\$ 0
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OR

☒ A check in the amount of \$ 1,080.00 is enclosed for the filing fee.

☒ The Commissioner is hereby authorized to charge any additional fees that may be required to
Deposit Account No. 50-1417.

Respectfully Submitted,

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Title of the Invention

METHOD AND APPARATUS FOR EVALUATING SECURITY AND
METHOD AND APPARATUS FOR SUPPORTING THE MAKING
OF SECURITY COUNTERMEASURE

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METHOD AND APPARATUS FOR EVALUATING SECURITY, AND
METHOD AND APPARATUS FOR SUPPORTING THE MAKING OF SECURITY
COUNTERMEASURE

This application claims priority from Japanese Patent Application Reference No. 11-277265, filed September 29, 1999, the entire content of which is incorporated herein by reference for all purposes.

BACKGROUND OF THE INVENTION

The present invention relates to a technology for evaluating the state of security of a system constituted by at least one component, or for supporting the making of security countermeasures specific to the system.

5 In the business activities of enterprises, an information system based on an Internet technology has become an important infrastructure. Also, as interest in the connection of an intra-enterprise information system to the Internet has grown, a security problem such as an
10 illegal access to the intra-enterprise information system, the destruction of information assets by a virus, or the like has been recognized.

To protect the information system against such a security problem, an enterprise has taken individual
15 technical measures such as the setting up of a firewall, the introduction of a software against a virus, or the like

against individual security problems. However, in recent years, it has been desired that security countermeasures specific to the objective information system be taken in a comprehensive manner by analyzing a threat to the entire information system and by evaluating the state of security of the information system and by making a policy of countermeasures to be taken in the future on the basis of the results of evaluation.

Against this backdrop, Common Criteria for Information Technology Security Evaluation (IS 15408) was standardized in June, 1999 as a frame for systematically evaluating and constructing the security of an information technology product and an information system constituted by the information technology products. Also, Information Security Policies Made Easy (ISPME), a collection of examples of security policies to be executed to individual information systems, which was written by Mr. Charles Cresson Wood, a security expert in the U. S., and is centered on the operation and management of the information systems, was published by BASELINE SOFTWARE, INC. on June, 10, 1997.

Also, some people have started to offer the services of evaluating the state of security of an information system and supporting the making of security countermeasures directed toward the information system based on the above-stated Common Criteria for

Information Technology Security Evaluation or the collection of examples of security policies ISPME as consultant services.

SUMMARY OF THE INVENTION

5 When evaluating the state of security of an information system and supporting the making of security countermeasures directed toward the information system based on the above-stated Common Criteria for Information Technology Security Evaluation, it is
10 necessary to extract from the systematically specified Common Criteria for Information Technology Security Evaluation, requirements to be applied to each component constituting an information system whose state of security is to be evaluated or toward which security countermeasures
15 are to be made so as to make requirements specific to the information system. For this reason, any person other than an expert thoroughly familiar with the Common Criteria for Information Technology Security Evaluation and having a high level of expertise cannot carry out the work
20 described above. Therefore, it takes much time and increases working costs to carry out the work.

 Also, even when supporting the making of the security countermeasures based on the collection of examples of security policies (ISPME), it is necessary to extract from
25 the ISPME, examples corresponding to an information system

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toward which security countermeasure are to be made and to
make a security policy for the information system while
applying the extracted examples to the actual constitution
of the information system. For this reason, any person
5 other than an expert thoroughly familiar with the
correspondence between the collection of examples of
security policies (ISPME) and the actual constitution of
the information system and having a high level of expertise
can not carry out the work. Therefore, it takes much time
10 and increases working costs to carry out the work.

The present invention has been made in view of the
above-mentioned circumstances and it is the object of the
present invention to enable an operator to evaluate the
state of security of a system and to support the making of
15 security countermeasures of the system even if the operator
does not have a high level of expertise.

In order to solve the above-mentioned problems, the
first aspect of the present invention is a method for
evaluating security executed to a system constituted by at
20 least one component by the use of an electronic computer,
the method comprising the steps of:

a first step of accepting a first specification of a
system to be evaluated and a second specification of each
of the components constituting the system, from an operator
25 via an input unit connected to the electronic computer;

a second step of retrieving data from a database in

which constituent components and security countermeasures
to be executed to the constituent components are described
for each of system types, and of reading out security
countermeasures to be executed to the components
5 constituting the system to be evaluated, which are
specified by the second specification, out of the
constituent components of the system type corresponding to
that of the system to be evaluated which is specified by
the first specification;

10 a third step of displaying on a display unit
connected to the electronic computer, the security
countermeasures read out in the second step in
correspondence with each of the components constituting the
system to be evaluated which are specified by the second
15 specification, and of accepting from an operator via the
input unit, information whether or not each of the security
countermeasures being displayed is executed, for example,
in the form of a check list; and

a fourth step of evaluating a state of security
20 executed to the system to be evaluated, based on the
information that the security countermeasures of the
components constituting the system to be evaluated are
executed or not, and of displaying the evaluation results
on the display unit.

25 In this connection, the first step may include steps
of, for example, reading out all of the system types

described in the database, displaying them on the display unit, and accepting from the operator via the input unit a specification of any one of the system types being displayed, as the first specification of the system to be evaluated, and steps of reading out from the database all of the constituent components of the system type specified by the first specification, displaying them on the display unit, and accepting from the operator via the input unit, whether or not each of the constituent components being displayed is used in the system to be evaluated, as the second specification of each of the components constituting the system to be evaluated, for example, in the form of a check list.

Also, in the case where the database describes, as to each of the security countermeasures, a security type ensured by executing the security countermeasure concerned, the fourth step may include the steps of, for example, classifying the security countermeasures of each of the components constituting the system to be evaluated into the security types, determining, as to each of the security types, the ratio of the number of security countermeasures accepted as executed in the third step, to the number of security countermeasures classified into the security type concerned, and displaying on the display unit the ratio for each of the security types as the degree of accomplishment of the security countermeasures.

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Also, in the case where the database describes, as to each of the security countermeasures, a security type ensured by executing the security countermeasure concerned and the degree of risk avoided by executing the security countermeasure concerned (this degree of risk is expressed, for example, by annual damages probably caused when the security countermeasure is not executed), the fourth step may include the steps of, for example, classifying the security countermeasures of each of the components constituting the system to be evaluated into security types, determining, as to each of the security types, the total sum of the degrees of risks corresponding to the security countermeasures which are accepted as not executed in the third step, out of the security countermeasures classified into the security type concerned, and displaying on the display unit, the total sum of the degrees of risks of the security countermeasures classified into the security type concerned, as the degree of the remaining risk.

Or, in the case where the database describes, as to each of the security countermeasures, a security type ensured and a cost required by executing the security countermeasure concerned (this cost is expressed, for example, by an annual cost required by executing the security countermeasure), the fourth step may include the steps of, for example, classifying the security

countermeasures of each of the components constituting the system to be evaluated into the security types, determining, as to each of the security types, the total sum of the costs corresponding to the security

5 countermeasures accepted as executed in the third step, out of the security countermeasures classified into the security type concerned, and displaying on the display unit, the total sum of the costs for each of the security types as the required cost of the security countermeasures
10 classified into the security type concerned.

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In the present aspect of the invention, when an operator specifies a system to be evaluated and its constituent components by the use of the input unit, a security countermeasure list to be executed to the
15 constituent component concerned is displayed on a display unit for each of the components constituting the system to be evaluated. It is possible that the operator looks at the security countermeasures of each of the components displayed on the display unit, and, for example, puts a
20 check against a security countermeasure being displayed by the use of the input unit (in the form of a so-called check list) to input whether or not the security countermeasure is executed. When the operator inputs whether or not each of the security countermeasures of the components displayed
25 on the display unit is executed, by the use of the input unit, a state of security executed to the system to be

evaluated is evaluated and the evaluation results are displayed on the display unit.

In this way, according to the present aspect of the present invention, the security countermeasures to be
5 executed to each of the constituent components are displayed, only by operator's specifying the system to be evaluated and the constituent components thereof, and the state of security applied to the system to be evaluated can be evaluated only by operator's inputting whether or not
10 each of the security countermeasures is executed to each of the constituent components being displayed. Therefore, the operator can evaluate the state of security of the system without a high level of expertise.

Next, in order to solve the above-mentioned problems,
15 the second aspect of the present invention is a method for supporting the making of security countermeasures to be executed to a system constituted by at least one component by the use of an electronic computer, the method comprising the steps of:

20 a first step of accepting a first specification of a system to be supported and a second specification of each of the components constituting the system, from an operator via an input unit connected to the electronic computer;

a second step of retrieving data from a database in
25 which constituent components and the security countermeasures to be executed to the constituent

components are described for each of the system types and
of reading out the security countermeasures to be executed
to each of the components constituting the system to be
supported which are specified by the second specification,
5 out of the constituent components of the system type, the
system type corresponding to that of the system to be
supported which is specified by the first specification;
and

10 a third step of displaying on a display unit
connected to the electronic computer, the security
countermeasures read out in the second step in
correspondence with each of the components constituting the
system to be supported which are specified by the second
specification, for example, in the form of a list.

15 In this connection, the first step may include, for
example, steps of reading out all of the system types
described in the database, displaying them on the display
unit, and accepting from the operator via the input unit
the specification of any one of the system types being
20 displayed as the first specification of a system to be
supported, and steps of reading out from the database all
of the constituent components of the system type specified
by the first specification, displaying them on the display
unit, and accepting from the operator via the input unit
25 whether or not each of the constituent components being
displayed is used in the system to be supported, as the

second specification of the components constituting the system to be supported, for example, in the form of a check list.

Also, in the case where the database describes, as to
5 each of the security countermeasures, a security type ensured by executing the security countermeasure concerned, the second step may read out from the database, the security countermeasures and their security types to be executed to each of the components constituting the system
10 to be supported which is specified by the second specification, out of the constituent components of the system type, the system type corresponding to that of the system to be supported which is specified by the first specification, and the third step may display on the
15 display unit the security countermeasures and their security types which are read out in the second step in correspondence with each of the components constituting the system to be supported which are specified by the second specification.

Also, in the case where the database describes, as to
20 each of the security countermeasures, a security level ensured by executing the security countermeasure concerned, the first step may accept from the operator via the input unit, a third specification of the security level of the
25 security countermeasure applied to the system to be supported, in addition to the first specification of the

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system to be supported and the second specification of each
of the components constituting the system, and the second
step may read out from the database the security
countermeasures to be executed to the components
5 constituting the system to be supported which are specified
in the second specification, out of the constituent
components of the system type, the system type
corresponding to that of the system to be supported which
is specified by the first specification, each of the
10 security countermeasures having a level not higher than the
security level specified by the third specification.

In the present aspect of the present invention, when
the operator specifies a system to be supported and the
constituent components thereof by the use of the input
15 unit, a list of the security countermeasures to be executed
to each of the components constituting the system to be
supported is displayed on the display unit. In this
manner, according to the present aspect, the security
countermeasures to be executed to each of the constituent
20 components are displayed only by operator's specifying the
system to be supported and the constituent components
thereof and, therefore, the operator can construct the
security countermeasures to be executed to the system
without a high level of expertise.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the present invention will be described in detail based on the following figures, wherein:

FIG. 1 is a schematic constitutional illustration of a security support and evaluation apparatus 1 to which the first preferred embodiment in accordance with the present invention is applied;

FIG. 2 is an illustration showing one example of a security countermeasure database corresponding to an Internet connection system;

FIG. 3 is an illustration showing one example of a security countermeasure database corresponding to an Internet connection system;

FIG. 4 is an illustration showing one example of a security countermeasure database corresponding to an authentication system;

FIG. 5 is an illustration showing one example of a security countermeasure database corresponding to a plant system;

FIG. 6 is a flow chart to explain the process of the security support and evaluation apparatus 1 of the first preferred embodiment in accordance with the present invention;

FIG. 7 is a flow chart to explain the process of a security support and evaluation apparatus 1 of the first preferred embodiment in accordance with the present

invention;

FIG. 8 is an illustration showing a GUI screen for selecting a system which is to be supported in the making of security countermeasures or whose state of security is
5 to be evaluated;

FIG. 9 is an illustration showing a GUI screen for selecting components of the system which is to be supported in the making of security countermeasures or whose state of security is to be evaluated;

10 FIG. 10 is an illustration showing one example of a security countermeasure list shown for supporting the making of the security countermeasures;

FIG. 11 is one example of a GUI screen for checking whether or not each of the security countermeasures
15 displayed is executed for the evaluation of security;

FIG. 12 is an illustration showing one example of a GUI screen for accepting from an operator a target level of security to be achieved;

FIG. 13 is an illustration showing the results of the
20 evaluation of security in the case where the target level of security is set as a ratio of the number of executed security countermeasures to the number of security countermeasures for each of the countermeasure types;

FIG. 14 is an illustration showing the results of the
25 evaluation of security in the case where the target level of security is set as a total sum of the required cost of

the executed security countermeasures for the each of the countermeasure types;

FIG. 15 is an illustration showing the results of evaluation of security in the case where the target level
5 of security is set as a total sum of the remaining risks caused by the not-yet-executed security countermeasures for each of the countermeasure types;

FIG. 16 is a schematic illustration of a security support and evaluation system to which the second preferred
10 embodiment in accordance with the present invention is applied;

FIG. 17 is a schematic constitutional illustration of a security support and evaluation apparatus 1 used in the
15 second preferred embodiment in accordance with the present invention;

FIG. 18 is an illustration for explaining a DB address management table 134 stored in an external storage
unit 13 of the security support and evaluation apparatus 1 used in the second preferred embodiment in accordance with
20 the present invention;

FIG. 19 is a schematic constitutional illustration of a database management unit 2_i ($1 \leq i \leq n$) used in the
second preferred embodiment in accordance with the present invention;

FIG. 20 is a flow chart for explaining the processing
25 of a step S1005 in FIG. 6 in a security support and

evaluation apparatus 1 used in the second preferred embodiment in accordance with the present invention; and

FIG. 21 is a flow chart for explaining the processing of a database management unit 2_i ($1 \leq i \leq n$) used in the second preferred embodiment in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments in accordance with the present invention will be described in the following.

First, the first preferred embodiment in accordance with the present invention will be described.

FIG. 1 is a schematic constitutional illustration of a security support and evaluation apparatus 1 to which the first preferred embodiment in accordance with the present invention is applied.

As shown in FIG. 1, a security support and evaluation apparatus 1 of the present preferred embodiment can be constituted on an electronic computer having an ordinary constitution and provided with a CPU 11, a memory 12, an external storage unit 13 such as a hard disk unit, a reader 14 for reading data from a portable storage medium 15 such as a CD-ROM, a FD, or the like, an input unit 16 such as a key board, a mouse, or the like, a display unit 17 such as a CRT, an LCD, or the like, a communication unit 18 connected to a network, and an interface 19 for sending or

receiving data to or from the above-mentioned constituent units.

Here, in the external storage unit 13 is stored a security evaluation and construction support program PG 132 for constructing the security support and evaluation apparatus 1 of the present preferred embodiment on the electronic computer, and the CPU 11 executes the program PG 132 loaded into the memory 12 to realize, as processes, a countermeasure list making section 111 for making a list of security countermeasures to be executed on each constituent component of an objective system specified by an operator, a security evaluation section 112 for evaluating a state of security of the objective system based on the information accepted from the operator, whether or not the security countermeasures to be executed to each of the constituent components of the objective system is executed, and an input/output control section 113 for controlling the input unit 16 and the display unit 17 to accept various kinds of commands from the operator or to display an output from the countermeasure list making section 111 and the security evaluation section 112.

In this connection, the program 132 may be read out from the portable storage medium 15 such as a CD-ROM, a FD, or the like by means of a reader 14 and be installed in the external storage unit 13, or may be down-loaded into the external storage unit 13 from a network by means of a

communication unit 18. In FIG. 1, although the program 132 is once stored in the external storage unit 13 and then is loaded into the memory 12 and is executed by the CPU 11, the program 132 may be read out from the portable storage medium 15 by the reader 14 and be directly loaded into the memory 12 and be executed by the CPU 11, or the program 132 may be directly loaded into the memory 12 from the network via the communication unit 18 and be executed by the CPU 11.

Further, in the external storage unit 13 are previously stored countermeasure databases DB_1 to DB_n 131 each of which describes, as to each of the system types to which the security evaluation and construction support in accordance with the present preferred embodiment are intended to apply, security countermeasures to be applied to the constituent components of a system of the system type concerned. In the present preferred embodiment, an Internet connection system, an authentication system, and a plant system are assumed as the system types to which the security evaluation and construction support are intended to apply.

FIG. 2 to FIG. 5 show one example of a countermeasure database.

Here, FIG. 2 and FIG. 3 show the content of a countermeasure database corresponding to an Internet connection system. FIG. 4 shows the content of a

countermeasure database corresponding to an authentication system, and FIG. 5 shows the content of a countermeasure database corresponding to plant system.

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In FIG. 2 to FIG. 5, the countermeasure types
5 (security types) are described in column 201. In column 202, a security countermeasure for ensuring security described in the box of the countermeasure type in the same row is described. In column 203, an assumed threat that is assumed by the security countermeasure described in the box
10 of the countermeasure type in the same row is described. In column 204, there is described a functional requirement which is selected from the catalog of security functional requirements stipulated in a security evaluation standard common criterion (IS 15408) and which satisfies the
15 security countermeasure described in the box of the countermeasure type in the same row. If it is mandatory to take the security countermeasure described in the box of the countermeasure type in the same row, by the criterion of the line of business (for example, a finance industry),
20 a message to the effect that it is mandatory to execute the security countermeasure is described in column 205₁.

Also, column 206₁ is provided for each of the constituent components, which are intended for use as a component of an objective system. In the case where a
25 security countermeasure described in the box of the security countermeasure in the same row is available to be

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applied, in the column 206_i there are described a security level L1, L2, or L3 ensured by applying the security countermeasure, an annual required cost C1, C2, C3, C4, or C5 necessary to apply the security countermeasure, and a
5 remaining risk R1, R2, R3, R4, or R5 shown by annual damages arising when the assumed threat described in the box of an assumed threat in the same row is turned into reality by not applying the security countermeasure.

Further, column 207 is provided for a facility in
10 which constituent components intended for use as the components of an objective system are installed. In the case where the security countermeasure described in the box of the security countermeasure in the same row is available to be applied, as is the case with the column 206_i, in
15 column 207 are described a security level L1, L2, or L3 ensured by applying the security countermeasure, an annual requirement cost C1, C2, C3, C4, or C5 necessary to apply the security countermeasure, and a remaining risk R1, R2, R3, R4, or R5 shown by annual damages arising when the
20 assumed threat described in the box of the assumed threat in the same row is turned into reality by not applying the security countermeasure.

Still further, in the case where the security countermeasure described in the box of the security
25 countermeasure in the same row is available to be applied to the operation of an objective system, as is the case

connection system. Further, a security level ensured by applying the security countermeasure to the WWW server is L3 (strongest), an annual required cost necessary to apply the security countermeasure to the WWW server is C2 (less than one million yen), and annual damages (remaining risk) arising in the case where the assumed threat of "illegal use" is turned into reality by not applying the security countermeasure to the WWW server is R2 (less than one million yen). Still further, a security level ensured by applying the security countermeasure to a client is L3 (strongest), an annual requirement cost necessary to apply the security countermeasure to the client is C2 (less than one million yen), and annual damages (remaining risk) arising in the case where an assumed threat of "illegal use" is turned into reality by not applying the security countermeasure to the client is R2 (less than one million yen).

In this connection, it is desirable that the content described in each box of the columns 206₁, 207, and 208 of the database shown in FIG. 2 to FIG. 5 is determined based on the results of the analysis of threat or risk conducted in advance.

Next, the processing of the security support and evaluation apparatus 1 of the above-mentioned constitution will be described.

FIG. 6 and FIG. 7 are flow charts for explaining the

processing of the security support and evaluation apparatus
1 of the first preferred embodiment in accordance with the
present invention.

First, the countermeasure list making section 111
5 displays a GUI screen including the list of the names of
the objective system of the countermeasure databases DB_1 to
 DB_n 131 stored in the external storage unit 13 and for
selecting a name of the system which becomes the object of
support for the making of security countermeasures or the
10 system which becomes the object of evaluation of the state
of security, as shown in FIG. 8, on the display unit 17 by
the use of the input/output control section 113 (step
S1001).

When a name of the system which becomes the object of
15 support for the making of security countermeasures or the
system which becomes the object of evaluation of the state
of security is selected by an operator by the use of the
input unit 16 via a GUI screen shown in FIG. 8 (in FIG. 8
is shown the example in which an Internet connection system
20 is selected) (step S1002), the countermeasure list making
section 111 reads out the names of the constituent
components of the selected system from the countermeasure
databases DB_1 to DB_n 131 stored in the external storage unit
13. Then, a GUI screen including a list of names of the
25 constituent components of the selected system and for
selecting a constituent component of the system which

becomes the object of support for making of security countermeasures or the constituent component of the system which becomes the object of evaluation of the state of security, as shown in FIG. 9, is displayed on the display unit 17 by the use of the input/output control section 113 (in FIG. 9 is shown the example in which an Internet connection system is an objective system) (step S1003).

In this connection, in FIG. 9, an item of "constitution of component" 801 is provided for selecting a component actually used in the system which becomes the object of support for making security countermeasures or the object of evaluation of the state of security from the components constituting a system read out from the corresponding countermeasure databases DB₁, to DB_n 131 and selected in step S1002. The operator can put a check by the use of the input unit 16 against the name of a component being used. An item of "environment" 802 is provided for setting whether or not the facility in which the constituent components of an objective system are installed and the operation of the objective system are included in the object of support for making security countermeasures or the object of evaluation of the state of security. The operator can put a check by the use of the input unit 16 against what he or she wants to include in the object. Also, an item of "security strength" 803 is provided for setting the level of security in supporting

the making of the security countermeasures or in evaluating the state of security, and the operator can put a check by the use of the input unit 16 against a level that he or she wants to set. Here, a level of "normal" is to be selected in the case where supporting the making of the security countermeasures or evaluation of the state of security is conducted for the purpose of ensuring a minimum essential security of the objective system. This level corresponds to a level L1 shown in FIG. 2 to FIG. 5. A level of "strongest" is to be selected in the case supporting the making of the security countermeasures or evaluation of the state of security is conducted for the purpose of ensuring a maximum security of the objective system. This level corresponds to a level L3 shown in FIG. 2 to FIG. 5. Also, a level of "strong" is in the middle between the level of "normal" and the level of "strongest" and corresponds to a level L2 shown in FIG. 2 to FIG. 5. Further, a button of "countermeasure construction support" 804 is to be selected in the case where the present apparatus 1 supports the making of security countermeasures and a button of "security evaluation" 805 is to be selected in the case where the present apparatus 1 executes the evaluation of security.

Next, when the operator puts a check against the
25 necessary items by the use of the input unit 16 and selects
either the button 804 or the button 805 via the GUI screen

shown in FIG. 9 (step S1004), the countermeasure list making section 111 reads out necessary information from the countermeasure databases DB₁ - DB_n 131 corresponding to the system selected in the step S1002 and makes a security countermeasure list as to each of the components checked in the item of "constitution of component" 801 and the environment checked in the item "environment" 802 (step S1005).

Taking the case shown in FIG. 9 (where a WWW server and a client are checked in the item of "constitution of component" 801 and an operation is checked in the item of "environment" 802) as an example, a process of making a security countermeasure list will be described below.

First, in each row of the column 206₁ of "WWW server" of the database of the Internet connection system shown in FIG. 2 and FIG. 3, attention is to be directed toward the rows in which it is described that the security countermeasure in the same row is available to be applied and that the security level ensured when the security countermeasure is applied is not higher than a level checked in the item of "security strength" in FIG. 9 (here, "normal" = L1). Then, as to each of the rows to which attentions are directed, the contents described in the column 206₁ of "WWW server" and in the columns 201 to 204, and 205₁ are read out and a security countermeasure list for the WWW server is made based on the contents thus read out.

The above-mentioned processing is executed for the column 206₂ of "client" and the column 208 of "operation" in the same way to thereby make a security countermeasure list for the client and a security countermeasure list for the operation.

When the countermeasure list making section 111 makes the security countermeasure lists for each of the components checked in the item of "constitution of component" 801 and the environments checked in the item of "environment" 802 in the screen shown in FIG. 9, as mentioned above, the countermeasure list making section 111 then judges whether the button selected in a step S1004 is the button of "countermeasure construction support" 804 or the button of "security evaluation" 805 (step S1006).

In the case where the button of "countermeasure construction support" 804 is selected, the countermeasure list making section 111 displays on the display unit 17 via the input/output control section 113, the security countermeasure lists which are made in the step S1005 for each of the components checked in the item of "constitution of component" 801 and each of the environments checked in the item of "environment" 802 to support the making of the security countermeasures (step S1007).

FIG. 10 is an illustration showing an example of the security countermeasure lists displayed for supporting the making of the security countermeasures. This example shows

lists made from the database of the Internet connection system shown in FIG. 2 and FIG. 3 according to the contents checked shown in FIG. 9. Here, the security countermeasure lists of the WWW server, the client, and the operation are
5 separately displayed, and the operator can display a desired security countermeasure list by selecting a tag 901 by the use of the input unit 16. In this connection, reference characters 902, 903 designate buttons for scrolling the security countermeasure list, which is being
10 displayed.

On the other hand, in the case where the button of "security evaluation" 805 is selected in the step S1006, the security evaluation section 112 displays on the display unit 17 via input/output control section 113, a GUI screen
15 for making sure whether or not each of the security countermeasures included in each of the security countermeasure lists are executed, those lists being made in the step S1005 for each of the components checked in the item of "constitution of component" 801 and the
20 environments checked in the item of "environment" 802 (step S1008).

FIG. 11 is an illustration showing an example of the GUI screen for making sure whether or not each of the security countermeasures displayed for security evaluation
25 is executed. This example shows a GUI screen made on the basis of the lists made from the database of the Internet

connection system shown in FIG. 2 and FIG. 3 according to the contents shown in FIG. 9. Here, the GUI screen shown in FIG. 11 has the constitution in which column 904 is added to the display screen shown in FIG. 10, the column 904 including input boxes in each of which it is possible to put a check so as to indicate that the security countermeasure described in the same row is executed. In this connection, a button of "reset" 906 is provided for resetting the check in each input box of the column 904 and for putting a check again.

When the operator puts a check via the GUI screen shown in Fig. 11 as described above, in at least one of the input boxes by the use of the input unit 16, and then selects the button of "execute" 905 (step S1009), the security evaluation section 112 displays a GUI screen shown in FIG. 12 for accepting the target level of security to be accomplished from the operator on the display unit 17 via the input/output control section 113 (step S1010).

In the example shown in FIG. 12, the operator can select from three setting patterns of the target level of security for each of the components and environments displayed on the GUI screen shown in FIG. 11; setting by the ratio of the number of executed (achieved) security countermeasures to the number of security countermeasures for each of the countermeasure types (910), setting by the total sum of the required costs for the executed security

countermeasures for each of the countermeasure types (911), or setting by total sum of remaining risks caused by the not-yet-executed (not achieved) security countermeasures for each of the countermeasure types. Here, in the case where the target level of security is set by the ratio of the number of executed security countermeasures to the number of security countermeasures for each of the countermeasure types, it is possible to select the adoption of the criterion of a specific line of business (line of business A, B) as an option. When the adoption of the criterion of a specific line of business is selected, the target level of security is set as the ratio of the number of executed security countermeasures to the number of security countermeasures obliged by the criterion for each of the countermeasure types. In this connection, in FIG. 12 is shown an example in which the ratio of the number of executed security countermeasures to the number of security countermeasures for each of the countermeasure types is set at 80% or more.

When the operator sets the target level of security by the use of the input unit 16 via the GUI screen shown in FIG. 12 (step S1011) as mentioned above, then, the state of security of the objective system is evaluated according to the contents of settings (step S1012).

For example, in the case where the target level of security is set as the ratio of the number of executed

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security countermeasures to the number of security countermeasures for each of the countermeasure types in the step S1011, the security evaluation section 112 determines, as to each of the components and the environments displayed on the GUI screen shown in Fig. 11 (that is for each of the WWW server, the client, and the operation), the ratio of the number of executed security countermeasures (that is, a check indicating execution is put in the input box), to the number of security countermeasures classified into each of the countermeasure types (step S1013). Then, the security evaluation results are displayed on the display unit 17 via the input/output control section 113 (step S1014).

FIG. 13 shows an example of the results of the security evaluation in the case where the target level of security is set as the ratio of the number of executed security countermeasures to the number of security countermeasures for each of the countermeasure types. This example shows the case where the target level of security is set at 80% or more in the GUI screen shown in FIG. 12. Here, the security evaluation results of each of the WWW server, the client, and the operation are separately displayed and the operator can display the desired security evaluation results by selecting the tag 913 by the use of the input unit 16.

Also, in the example shown in FIG. 13, the ratio of the number of executed security countermeasures to the

number of security countermeasures for each of the countermeasure types is displayed by the use of a so-called radar chart having the countermeasures types as axes. Here, a solid line shows a line joining the points on the axes each of which corresponds to the ratio of the number of executed security countermeasures to the number of security countermeasures for the countermeasure type designated by the axis, that is, the results of security evaluation. On the other hand, a dotted line is a line joining points on the axes corresponding to the target values set in the GUI screen shown in FIG. 12.. The operator can visually grasp the state of security executed to the objective system by comparing the solid line showing the results of security evaluation with the dotted line showing the target levels.

When the set target level of security is the ratio of the number of executed security countermeasures to the number of security countermeasures for each of the countermeasure types and when the criterion of the specific line of business is set as an option in the step S1011, as to each of the components and the environments displayed on the GUI screen shown in FIG. 11, the ratio of the number of executed security countermeasures being obliged as the criterion of the specific line of business, to the number of security countermeasures that are classified into the countermeasure types being obliged as the criterion of the

specific line of business for each of the countermeasure types is determined in the step S1013.

Also, for example, in the case where the target level of security is set as the total sum of the cost required by the executed security countermeasures for each of the countermeasure types in the step S1011, the security evaluation section 112 determines, as to each of the components and the environments displayed on the GUI screen shown in FIG. 11, the total sum of the cost required by the executed security countermeasures, out of those classified into a countermeasure type for each of the countermeasure types (step S1015). Then, the results of security evaluation are displayed on the display unit 17 via the input/output control section 113 (step S1016).

FIG. 14 shows an example of the results of the security evaluation in the case where the target level of security is set as the total sum of the cost required by the executed security countermeasures for each of the countermeasure types. This example shows the case where a target value is set at less than one million yen/year in the GUI screen shown in FIG. 12. Also, in the example shown in FIG. 14, as is the case in FIG. 13, the total sum of the cost required by the executed security countermeasures for each of the countermeasure types is displayed by the use of a so-called radar chart having the countermeasure types as axes. Here, a solid line shows a

line joining the points on the axes each of which corresponds to the total sum of the cost required by the executed security countermeasures for each of the countermeasure types designated by the axis, that is, the results of security evaluation. On the other hand, a dotted line is a line joining points on the axes corresponding to the target values set in the GUI screen shown in FIG. 12. The operator can visually grasp the state of security executed to the objective system by comparing the solid line showing the results of security evaluation with the dotted line showing the target levels.

Also, for example, in the case where the target level of security is set as the total sum of remaining risks caused by the not-yet-executed security countermeasures for each of the countermeasure types in the step S1011, the security evaluation section 112 determines, as to each of the countermeasure types for the components and the environments displayed on the GUI screen shown in FIG. 11, the total sum of the remaining risks that are classified into the countermeasure type and that are caused by the not-yet-executed security countermeasures for each of the countermeasure types (step S1017). Then, the results of security evaluation are displayed on the display unit 17 via the input/output control section 113 (step S1018).

FIG. 15 shows an example of the results of the security evaluation in the case where the target level of

security is set as the total sum of the remaining risks caused by the not-yet-executed security countermeasures for each of the countermeasure types. This example shows the case where a target value is set at less than one million yen/year in the GUI screen shown in FIG. 12. Also, in the example shown in FIG. 15, as is the case in FIG. 13, the total sum of the remaining risks caused by the not-yet-executed security countermeasures for each of the countermeasure types is displayed by the use of a so-called radar chart having the countermeasures types as axes. Here, a solid line shows a line joining the points on the axes each of which corresponds to the total sum of the remaining risks caused by the not-yet-executed security countermeasures for each of the countermeasure types designated by the axis, that is, the results of security evaluation. On the other hand, a dotted line is a line joining points on the axes corresponding to the target values set in the GUI screen shown in FIG. 12. The operator can visually grasp the state of security executed to the objective system by comparing the solid line showing the results of security evaluation with the dotted line showing the target levels.

Up to this point, the first preferred embodiment in accordance with the present invention has been described.

25 In the first preferred embodiment, when the operator
specifies the constituent components of the objective

evaluate the state of security of the objective system,
without a high level of expertise.

Also, in the present preferred embodiment, the
operator can set the target level of security in the GUI
5 screen shown in FIG. 12. Also, as shown in FIG. 13 to FIG.
15, the results of security evaluation are displayed in
such a way that it can be compared with the set target
levels. This enables the operator to obtain the results of
security evaluation, which are produced in consideration of
10 the circumstances specific to the objective system to be
evaluated, such as the size of the system, the security
level required of the system.

Further, in the present preferred embodiment, when
the operator specifies the constituent components of the
15 objective system and selects the button of "construction
support" by the use of the input unit 16 in the GUI screen
shown in FIG. 9, the GUI screen including the security
countermeasure lists to be executed to the specified
components, as shown in FIG. 10, is displayed on the
20 display unit 17. In this manner, according to the present
preferred embodiment, only a matter of operator's
specifying the constituent components of the objective
system toward which security countermeasures are to be
constructed makes it possible to display the security
25 countermeasures to be executed to the constituent
components thus specified. Therefore, the operator can

construct security countermeasures to be executed the objective system, without a high level of expertise.

Still further, since the security countermeasures having a strength not higher than a security strength selected in the GUI screen shown in FIG. 9 is displayed in the security countermeasure lists shown in FIG. 10, the operator can display security countermeasure lists to be executed to the objective system in consideration of the circumstances specific to the objective system such as the size of the objective system and the security level required of the objective system.

Next, the second preferred embodiment in accordance with the present invention will be described.

FIG. 16 is a schematic illustration of a security support and evaluation system to which the second preferred embodiment in accordance with the present invention is applied.

In the above-mentioned first preferred embodiment, the case has been described in which the security countermeasure databases $DB_1 - DB_n$ 131 are stored in the external storage unit 13 of the security support and evaluation apparatus 1. In contrast to this, in the present preferred embodiment, as shown in FIG. 16, in consideration of the case where a security support and evaluation apparatus 1 is constructed on, for example, a portable electronic computer, security countermeasure

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databases DB_1 to DB_n 131 are stored in database management units 2_1 to 2_n ($n \geq 1$) constructed on an electronic computer other than the security support and evaluation apparatus 1 and the security support and evaluation apparatus 1
5 accesses to the database management units 2_i ($1 \leq i \leq n$) via a network such as a public network to obtain information necessary to make security countermeasure lists.

FIG. 17 is a schematic constitutional illustration of a security support and evaluation apparatus 1 used in the
10 second preferred embodiment in accordance with the present invention. Here, parts having the same functions as the security support and evaluation apparatus 1 used in the first preferred embodiment in accordance with the present invention shown in Fig. 1 have the same reference numerals.

15 As shown in FIG. 17, the security support and evaluation apparatus 1 used in the second preferred embodiment is different from the security support and evaluation apparatus 1 used in the first preferred embodiment shown in Fig. 1 in that the security
20 countermeasure databases DB_1 to DB_n 131 are not stored in an external storage unit 13 and that in the external storage unit 13 are stored a communication program PG 133 for accessing the database management units 2_1 to 2_n ($n \geq 1$) via a network and a database address management table 134 in
25 which the access points (addresses) of the respective database management units 2_1 to 2_n shown in FIG. 18 are

stored. A CPU 11 loads a communication PGM 133 into memory 12 and executes the PGM 133 so as to realize, as a process, a communication control section 114 which processes various kinds of groups of protocols necessary to access the
5 database management units 2_1 to 2_n via the network such as a public network by means of a communication unit 18 and to establish a communication between the database management units 2_1 and 2_n .

FIG. 19 is a schematic constitutional illustration of
10 the database management units 2_i ($1 \leq i \leq n$) used in the second preferred embodiment in accordance with the present invention. Here, parts having the same functions as the security support and evaluation apparatus 1 used in the first preferred embodiment in accordance with the present
15 invention shown in Fig. 1 have the same reference numerals.

As shown in FIG. 19, the database management units 2_i of the present preferred embodiment is different from the security support and evaluation apparatus 1 shown in FIG. 17 in that a security countermeasure database DB_i 131 and a
20 database management program PG 135 are stored in an external storage unit 13 instead of the database address management table 134 and an evaluation and construction support program PG 132. A CPU 11 loads the database management program PG 135 into a memory 12 and executes it
25 so as to realize, as a process, a database DB retrieval section 115 which reads out necessary information from the

security countermeasure database DB₁ 131 stored in the external storage unit 13 according to a request accepted from the security support and evaluation apparatus 1 via a communication control section 114 and sends the information to the security support and evaluation apparatus 1.

Next, the processing of the security support and evaluation system having the above-mentioned constitution will be described.

First, the action of the security support and evaluation apparatus 1 shown in FIG. 17 will be described.

The processing of the security support and evaluation apparatus 1 of the present preferred embodiment is basically similar to the action of the security support and evaluation apparatus 1 of the first preferred embodiment shown in FIG. 6 and FIG. 7. However, they are different from each other in the following points:

That is, in the step S1001, the security support and evaluation apparatus 1 previously stores, for example, in the external storage unit 13, the names of objective systems of the security countermeasure databases DB₁ to DB_n 131 stored by the database management units 2₁ to 2_n and a countermeasure list making section 111 reads out the name of each objective system of the security countermeasure databases DB₁ to DB_n 131 from the external storage unit 13 and displays the GUI screen shown in FIG. 8 by the use of the input/output control section 113.

Also, in the step S1003, the countermeasure list making section 111 passes a command for reading out the names of the constituent components of the system selected in the step S1002 from the database management unit 2_i storing the security countermeasure database of the system to a communication control section 114. When the communication control section 114 receives the command, it gets the address of the database management unit 2_i from the database address management table 134 stored in the external storage unit 13 and sends the command to the database management unit 2_i via a communication unit 18. Then, when the communication control section 114 receives the names of the constituent components of the system from the database management unit 2_i, it passes the names to the countermeasure list making section 111. When the countermeasure list making section 111 receives the names, it displays the GUI screen including the list of the accepted names of the constituent components, as shown in FIG. 9, by the use of the input/output control section 113.

Further, a processing shown in FIG. 20 is executed in the step S1005.

First, the countermeasure list making section 111 passes a retrieval command for reading out necessary information from the database management unit 2_i storing the security countermeasure database of the system selected in the step S1002 to the communication control section 114

with the contents of the items checked by the operator via the GUI screen shown in FIG. 9 in the step S1004 (step S1101).

When the communication control section 114 receives the retrieval command, it gets the address of the database management unit 2_i from the database address management table 134 stored in the external storage unit 13 and sends the retrieval command of the database including the contents of the above-mentioned checked items to the database management unit 2_i via the communication unit 18 (step S1102). Then, when the communication control section 114 receives the results of retrieval from the database management unit 2_i (step S1103), it passes them to the countermeasure list making section 111.

When the countermeasure list making section 111 receives the results of retrieval, it makes a security countermeasure lists for each of the components checked in the item of "constitution of component" 801 in the GUI screen shown in FIG. 9 and for each of the environments checked in the item of "environment" 802 based on the results of retrieval (step S1104).

Next, the process of the database management unit 2_i shown in FIG. 19 will be described.

FIG. 21 is a flow chart to explain the process of the database management unit 2_i used in the second preferred embodiment in accordance with the present invention.

First, when the communication control section 114 receives a command for reading out the names of the constituent components of a system from the security support and evaluation apparatus 1 via the communication unit 18 (step S2001), it passes the command to a database retrieval section 115. When the database retrieval section 115 receives the names, it reads out the names of each of the constituent component described in the column 206 of the database from the security countermeasure database DB_i stored in the external storage unit 13 (see FIG. 2 to FIG. 5) and passes them to the communication control section 114 (step S2002). The communication control section 114 sends the received names of each of the constituent components to the security support and evaluation apparatus 1 (step S2003).

Then, when the communication control section 114 receives the retrieval command including the names of the constituent components, the environments, and the security strength which are checked in the GUI screen shown in FIG. 9 from the security support and evaluation apparatus 1 via the communication unit 18 (step S2004), it passes the retrieval command to the database retrieval section 115. When the database retrieval section 115 receives the retrieval command, it reads out necessary information from the security countermeasure database DB_i stored in the external storage unit 13 (step S2005).

For example, in the case where the security countermeasure database DB₁ stored in the external storage unit 13 is for an Internet connection system shown in FIG. 2 and FIG. 3 and where the names of the constituent components and the environment included in the retrieval command are "WWW server", "client", and "operation" and where the security strength is "normal", the database retrieval section 115 reads out the necessary information in the following way.

10 First, in the rows of the column 206₁ of "WWW server" of the database of an Internet connection system shown in FIG. 2 and FIG. 3, attention must be paid to the rows in which it is described that the security countermeasure of the same row can be applied and that the security level
15 ensured when the security countermeasure is applied is not higher than a security strength included in the retrieval command (here, "normal" = L1). Then, for the respective rows to which attention has been paid, the contents described in the column 206₁ of the "WWW server" and the
20 contents described in the columns 201 to 204 and 205₁ are read out. The above-mentioned processing is executed in the similar way for the column 206₂ of "client" and for the column 208 of "operation" to read out the necessary information for the constituent components and the
25 environments included in the retrieval command.

Next, the database retrieval section 115 passes the

information read out in the above-stated manner to the communication control section 114. The communication control section 114 sends the received information to the security support and evaluation apparatus 1 as the results of retrieval (step S2006).

Up to this point, the second preferred embodiment in accordance with the present invention has been described.

In the present preferred embodiment, the security countermeasure databases DB_1 to DB_n 131 are stored in the database management units 2_1 to 2_n constructed in the electronic computer other than the security support and evaluation apparatus 1 and the security support and evaluation apparatus 1 gets access to the database management units 2_i via the network such as the public network to obtain information necessary to make the security countermeasure lists. Therefore, the present preferred embodiment is very suitable in the case where the security support and evaluation apparatus 1 is constructed, for example, in a portable electronic computer.

In this connection, while the security support and evaluation apparatus 1 stores previously in the external storage unit 13 the names of each objective system of the security countermeasure databases DB_1 to DB_n 131 stored by the database management units 2_1 to 2_n in the above-mentioned preferred embodiment, the security support and evaluation apparatus 1 may periodically accesses each of

the database management units 2_1 to 2_n to get the
information of the names. Also, in this case, if the
security support and evaluation apparatus 1 may
periodically gets the names of the constituent components
5 of the objective system with the names of the objective
systems of the security countermeasure database from the
database management units 2_1 to 2_n , it is not necessary to
change the step S1003 in FIG. 6.

As described above, according to the present
10 invention, it is possible to evaluate the state of security
of the system and to support the making of the security
countermeasures without a high level of expertise.

What is claimed is:

- 1 1. A method for evaluating security executed to a system
2 constituted by at least one component, by the use of an
3 electronic computer, the method comprising steps of:
4 a first step of accepting a first specification of a
5 system to be evaluated and a second specification of each
6 of the components constituting the system, from an operator
7 via an input unit connected to the electronic computer;
8 a second step of retrieving data from a database in
9 which constituent components and security countermeasures
10 to be executed to the constituent components are described
11 for each of system types, and of reading out security
12 countermeasures to be executed to the components
13 constituting the system to be evaluated which are specified
14 by the second specification, out of the constituent
15 components of the system type, the system type
16 corresponding to that of the system to be evaluated which
17 is specified by the first specification;
18 a third step of displaying on a display unit
19 connected to the electronic computer, the security
20 countermeasures read out in the second step in
21 correspondence with each of the components constituting the
22 system to be evaluated which are specified by the second
23 specification and of accepting from the operator via the
24 input unit, information whether or not each of the security

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25 countermeasures being displayed is executed; and
26 a fourth step of evaluating a state of security of
27 the system to be evaluated, based on the information that
28 the security countermeasures of the components constituting
29 the system to be evaluated are executed or not, the
30 information being accepted in the third step, and of
31 displaying evaluation results on the display unit.

1 2. A method for evaluating security as claimed in claim 1,
2 wherein
3 the database describes, as to each of the security
4 countermeasures, a security type ensured by executing the
5 security countermeasure concerned, and wherein
6 the fourth step includes steps of:
7 classifying the security countermeasures , which are
8 read out in the second step, into the security types;
9 determining, as to each of the security types, the
10 ratio of the number of security countermeasures accepted as
11 executed in the third step, to the number of security
12 countermeasures classified into the security type
13 concerned; and
14 displaying on the display unit the ratio for each of
15 the security types as the degree of accomplishment of the
16 security countermeasures classified into the security type
17 concerned.

1 3. A method for evaluating security as claimed in claim 1,
2 wherein

3 the database describes, as to each of the security
4 countermeasures, a security type ensured and the degree of
5 risk avoided, by executing the security countermeasure
6 concerned, and wherein

7 the fourth step includes steps of;

8 classifying the security countermeasures, which are
9 read out in the second step, into the security types;

10 determining, as to each of the security types, the
11 total sum of the degrees of risks corresponding to the
12 security countermeasures accepted as non-executed in the
13 third step, out of the security countermeasures classified
14 into the security type concerned; and displaying on the
15 display unit the total sum of the degrees of risks for each
16 of the security types as the degree of the remaining risk
17 of the security countermeasures classified into the
18 respective security types.

1 4. A method for evaluating security as claimed in claim 1,
2 wherein

3 the database describes, as to each of the security
4 countermeasures, a security type ensured and a cost
5 required, by executing the security countermeasure
6 concerned, and wherein

7 the fourth step includes steps of:

8 classifying the security countermeasures, which are
9 read out in the second step, into the security types;
10 determining, as to each of the security types, the
11 total sum of the costs corresponding to the security
12 countermeasures accepted as executed in the third step, out
13 of the security countermeasures classified into the
14 security type concerned; and displaying on the display
15 unit, the total sum of the costs for each of the security
16 types as the required cost of the security countermeasures
17 classified into the security type concerned.

1 5. A method for evaluating security as claimed in claim 1,
2 wherein
3 the database describes, as to each of the security
4 countermeasures, a security level ensured by executing the
5 security countermeasure concerned, and wherein
6 the first step includes a step of accepting from the
7 operator via the input unit, a third specification of the
8 security level of the system to be evaluated in addition to
9 the first specification of the system to be evaluated and
10 the second specification of the components constituting the
11 system, and wherein
12 the second step includes a step of reading out from
13 the database, the security countermeasures to be executed
14 to components constituting the system to be evaluated,
15 which are specified by the second specification, out of the

16 constituent components of the system type corresponding to
17 that of the system which is specified by the first
18 specification, each of the security countermeasures having
19 a level not higher than the security level specified by the
20 third specification.

1 6. A method for evaluating security as claimed in claim 1,
2 wherein

3 the first step includes,

4 steps of reading out all of the system types
5 described in the database, displaying them on the display
6 unit, and accepting from the operator via the input unit a
7 specification of any one of the system types being
8 displayed, as the first specification of the system to be
9 evaluated, and

10 steps of reading out from the database all of the
11 constituent components of the system type specified by the
12 first specification, displaying them on the display unit,
13 and accepting from the operator via the input unit,
14 information whether or not each of the constituent
15 components being displayed is used in the system to be
16 evaluated, as the second specification of each of the
17 components constituting the system to be evaluated.

1 7. A storage medium in which a program for making an
2 electronic computer evaluate security of a system

29 the security countermeasures to the components constituting
30 the system to be evaluated are executed or not, the
31 information being accepted in the third step, and of
32 displaying evaluation results on the display unit.

1 8. A program for making an electronic computer evaluate
2 security of a system constituted by at least one component,
3 the program making the electronic computer execute steps
4 of:

5 a first step of accepting a first specification of a
6 system to be evaluated and a second specification of each
7 of the components constituting the system, from an operator
8 via an input unit connected to the electronic computer;

9 a second step of retrieving data from a database in
10 which constituent components and security countermeasures
11 to be executed to the constituent components are described
12 for each of system types, and of reading out security
13 countermeasures to be executed to the components
14 constituting the system to be evaluated which are specified
15 by the second specification, out of the constituent
16 components of the system type, the system type
17 corresponding to that of the system to be evaluated which
18 is specified by the first specification;

19 a third step of displaying on a display unit
20 connected to the electronic computer, the security
21 countermeasures read out in the second step in

15 specification, and for accepting from the operator
16 information whether or not each of the constituent
17 components being displayed is used in the system to be
18 evaluated, as a second specification of each of the
19 components constituting the system to be evaluated;
20 a third specification accepting unit for reading out
21 from the database and displaying the security
22 countermeasures to be executed to the constituent
23 components specified by the second specification, out of
24 the constituent components of the system types specified by
25 the first specification, and for accepting from the
26 operator information whether or not each of the security
27 countermeasures being displayed is executed; and
28 an evaluation unit for evaluating a state of security
29 of the system to be evaluated, based on the information
30 that the security countermeasures of the constituent
31 components are executed or not, the information being
32 accepted by the third specification accepting unit, and for
33 displaying evaluation results of the state of security.

1 10. A method for supporting making of security
2 countermeasures to be executed to a system constituted by
3 at least one component by the use of an electronic
4 computer, comprising steps of:
5 a first step of accepting a first specification of a
6 system to be supported and a second specification of each

7 of the components constituting the system, from an operator
8 via an input unit connected to the electronic computer;

9 a second step of retrieving data from a database in
10 which constituent components and security countermeasures
11 to be executed to the constituent components are described
12 for each of system types and of reading out the security
13 countermeasures to be executed to the components
14 constituting the system to be supported which are specified
15 by the second specification, out of the constituent
16 components of the system type, the system type
17 corresponding to that of the system to be supported which
18 is specified by the first specification; and

19 a third step of displaying on a display unit
20 connected to the electronic computer, the security
21 countermeasures read out in the second step in
22 correspondence with each of the components constituting the
23 system to be supported which are specified by the second
24 specification.

1 11. A method for supporting the making of security
2 countermeasures as claimed in claim 10, wherein

3 the database describes, as to each of the security
4 countermeasures, a security type ensured by executing each
5 of the security countermeasure concerned, and wherein

6 the second step reads out from the database, the
7 security countermeasures and their security types for each

8 of the components constituting the system to be supported
9 which are specified by the second specification, out of the
10 constituent components of the system type corresponding to
11 that of the system to be supported which is specified by
12 the first specification, and wherein

13 the third step displays on the display unit the
14 security countermeasures and their security types which are
15 read out in the second step in correspondence with each of
16 the components constituting the system to be supported
17 which are specified in the second specification.

1 12. A method for supporting making of security
2 countermeasures as claimed in claim 10, wherein

3 the database describes, as to each of the security
4 countermeasures, a security level ensured by executing the
5 security countermeasure concerned, and wherein

6 the first step accepts from the operator via the
7 input unit a third specification of the security level to
8 be applied to the system to be supported in addition to the
9 first specification of the system to be supported and the
10 second specification of the components constituting the
11 system, and wherein

12 the second step reads out from the database the
13 security countermeasures to be executed to the components
14 constituting the system to be supported which are specified
15 by the second specification, out of the constituent

16 components of the system type corresponding to that of the
17 system to be supported which is specified by the first
18 specification, each of the security countermeasures having
19 a level not higher than the security level specified by the
20 third specification.

1 13. A method for supporting making of security
2 countermeasures as claimed in claim 10, wherein
3 the first step includes,
4 steps of reading out all of the system types
5 described in the database, displaying them on the display
6 unit, and accepting from the operator via the input unit a
7 specification of any one of the system types being
8 displayed as the first specification of a system to be
9 supported, and
10 steps of reading out from the database all of the
11 constituent components of the system type specified by the
12 first specification, displaying them on the display unit,
13 and accepting from the operator via the input unit whether
14 or not each of the constituent components being displayed
15 is used in the system to be supported, as the second
16 specification of the components constituting the system to
17 be supported.

1 14. A storage medium in which a program for making an
2 electronic computer support making of security

3 countermeasures to be executed to a system constituted by
4 at least one component is stored, the program making the
5 electronic computer execute steps of:

6 a first step of accepting a first specification of a
7 system to be supported and a second specification of each
8 of the components constituting the system, from an operator
9 via an input unit connected to the electronic computer;

10 a second step of retrieving data from a database in
11 which constituent components and security countermeasures
12 to be executed to the constituent components are described
13 for each of system types and of reading out security
14 countermeasures to be executed to the components
15 constituting the system to be supported which are specified
16 by the second specification, out of the constituent
17 components of the system type, the system type
18 corresponding to that of the system to be supported which
19 is specified by the first specification; and

20 a third step of displaying on a display unit
21 connected to the electronic computer, the security
22 countermeasures read out in the second step in
23 correspondence with each of the components constituting the
24 system to be supported which are specified by the second
25 specification.

1 15. A program for making an electronic computer support
2 making of security countermeasures to be executed to a

3 system constituted by at least one component, the program
4 making the electronic computer execute steps of:

5 a first step of accepting a first specification of a
6 system to be supported and a second specification of each
7 of the components constituting the system, from an operator
8 via an input unit connected to the electronic computer;

9 a second step of retrieving data from a database in
10 which constituent components and security countermeasures
11 to be executed to the constituent components are described
12 for each of system types and of reading out security
13 countermeasures to be executed to the components
14 constituting the system to be supported which are specified
15 by the second specification, out of the constituent
16 components of the system type, the system type
17 corresponding to that of the system to be supported which
18 is specified by the first specification; and

19 a third step of displaying on a display unit
20 connected to the electronic computer, the security
21 countermeasures read out in the second step in
22 correspondence with each of the components constituting the
23 system to be supported which are specified by the second
24 specification.

1 16. A security construction support apparatus for
2 supporting making of security countermeasures to be
3 executed to a system constituted by at least one component,

[illegible]

A security support and evaluation system in accordance with the present invention accepts from an operator via an input unit 16, a first specification of a system to be evaluated and a second specification of each of the components constituting the system, and then retrieves data from a security countermeasure database 131 stored in an external storage unit 13 and reads out security countermeasures to be executed to each of the components of the specified system to be evaluated, and then displays on a display unit 17, the security countermeasures read out in correspondence with each of the components of the specified system to be evaluated, and then accepts from the operator via the input unit 16, information whether or not each of the security countermeasures is executed, and thereafter evaluates the state of security based on the information and displays evaluation results on the display unit 17.

INTERNET CONNECTION SYSTEM (NO.1)

FIG. 2

201	202	203	204	205 ₁	205 ₂	206 ₁	206 ₂	206 ₃	207	208
COUNTERMEASURE TYPE	SECURITY COUNTERMEASURE	ASSUMED THREAT	CC FUNCTIONAL REQUIREMENT	LINE OF BUSINESS A CRITERION	LINE OF BUSINESS B CRITERION	WWW SERVER	CLIENT	BORDER ROUTER	FACILITY OPERATION	
MANAGEMENT OF ACCESS AUTHORIZATION	SET THE MANAGER OF AN ACCESS AUTHORIZATION	ILLEGAL USE		◎	◎					L2.C2.R4
MANAGEMENT OF ACCESS AUTHORIZATION	SET A PASSWORD ON AN INDIVIDUAL BASIS	ILLEGAL USE	FMT_MSA.1			L3.C2.R2	L3.C2.R2			
MANAGEMENT OF ACCESS AUTHORIZATION	SET AN ACCESS AUTHORIZATION SUCH THAT THE STATE OF SETTING CAN BE CHECKED AT ANY TIME	ILLEGAL USE	FMT_MSA.1 FMT_MTD.1			L2.C2.R3	L2.C2.R3			
MANAGEMENT OF ACCESS AUTHORIZATION	LIMIT AN ACCESS TO AN PRIVILEGED USER	LEAKAGE OF INFORMATION	FDP_ACF.1 FDP_ACC.2 FIA_UAD.1	◎		L1.C2.R3	L3.C1.R3			
MANAGEMENT OF ACCESS AUTHORIZATION	LIMIT A PERSON CAPABLE OF USING A MANAGEMENT UTILITY	LEAKAGE OF INFORMATION	FDP_ACC.1 FDP_ACF.1			L1.C1.R3	L1.C1.R3	L1.C1.R3		
...
IDENTIFICATION AND AUTHENTICATION	LIMIT A TERMINAL CAPABLE OF BECOMING A PRIVILEGED USER BY A REMOTE ACCESS	ILLEGAL USE	FIA_UAU.2 FIA_UID.1	◎		L3.C3.R3		L2.C4.R3		
IDENTIFICATION AND AUTHENTICATION	CHECK A PERSON BY AN IP ADDRESS	ILLEGAL USE				L2.C2.R3		L1.C2.R3		
IDENTIFICATION AND AUTHENTICATION	DO NOT DISPLAY VARIOUS KINDS OF INFORMATION WHEN AUTHENTICATION IS NOT SUCCESSFUL	ILLEGAL USE	FIA_AFL.1 FIA_UAD.7			L1.C1.R2	L1.C2.R2	L1.C2.R2		
IDENTIFICATION AND AUTHENTICATION	LOCK A USER ID WHEN IT IS NOT AUTHENTICATED ONE TIME	ILLEGAL USE	FIA_AFL.1			L2.C3.R3		L1.C3.R3		
...

SECURITY LEVEL:

L1: NORMAL, L2: STRONG, L3: STRONGEST

ANNUAL COST REQUIRED:

C1: LESS THAN 100 THOUSAND C2: LESS THAN ONE MILLION

C3: LESS THAN 5 MILLION C4: LESS THAN 10 MILLION

C5: NOT LESS THAN 10 MILLION

ANNUAL REMAINING RISK:

R1: LESS THAN 100 THOUSAND R2: LESS THAN ONE MILLION

R3: LESS THAN 5 MILLION R4: LESS THAN 10 MILLION

R5: NOT LESS THAN 10 MILLION

INTERNET CONNECTION SYSTEM (NO. 2)

FIG. 3

201		202		203		204		205 ₁		205 ₂		206 ₁		206 ₂		206 ₃		207		208	
COUNTERMEASURE TYPE	SECURITY COUNTERMEASURE	ASSUMED THREAT	CC FUNCTIONAL REQUIREMENT	LINE OF BUSINESS A CRITERION	LINE OF BUSINESS B CRITERION	WWW SERVER	CLIENT	BORDER ROUTER	FACILITY OPERATION												
COUNTERMEASURE AGAINST VIRUS	PERIODICALLY START A VIRUS CHECKER	TAMPERING WITH INFORMATION				L3.C2.R3	L1.C1.R3														
COUNTERMEASURE AGAINST VIRUS	PERIODICALLY UPDATE THE DEFINITION OF A VIRUS	TAMPERING WITH INFORMATION				L3.C2.R3	L1.C1.R2														
COUNTERMEASURE AGAINST VIRUS	SET A PORTABLE MEMORY MEDIUM SUCH AS A FD OR THE LIKE UNUSABLE	TAMPERING WITH INFORMATION				L3.C1.R2	L3.C1.R2														
COUNTERMEASURE AGAINST VIRUS	PERIODICALLY CHECK A DEMON STARTING MECHANISM	TAMPERING WITH INFORMATION				L3.C3.R3															
COUNTERMEASURE AGAINST VIRUS	STOP AN UNNECESSARY SERVICE	ILLEGAL USE				L2.C2.R3	L1.C2.R3														
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
MANAGEMENT OF THE COMING AND GOING OF A PERSON INTO AND OUT OF A ROOM	LOCK AN ENTRANCE AND AN EXIT	DESTRUCTION OF COMPONENT		◎					L1.C4.R4												
MANAGEMENT OF THE COMING AND GOING OF A PERSON INTO AND OUT OF A ROOM	MANAGE A KEY NECESSARY TO ENTER A ROOM AT A PREDETERMINED POSITION	DESTRUCTION OF COMPONENT																	L2.C2.R4		
MANAGEMENT OF THE COMING AND GOING OF A PERSON INTO AND OUT OF A ROOM	ISSUE A LICENSE TO ENTER A ROOM	DESTRUCTION OF COMPONENT																	L2.C2.R4		
MANAGEMENT OF THE COMING AND GOING OF A PERSON INTO AND OUT OF A ROOM	SET A LEVEL FOR THE MANAGEMENT OF THE COMING OF A PERSON INTO A ROOM	DESTRUCTION OF COMPONENT																	L3.C3.R4		
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

SECURITY LEVEL:

L1: NORMAL, L2: STRONG, L3: STRONGEST

ANNUAL COST REQUIRED:

C1: LESS THAN 100 THOUSAND C2: LESS THAN ONE MILLION

C3: LESS THAN 5 MILLION C4: LESS THAN 10 MILLION

C5: NOT LESS THAN 10 MILLION

ANNUAL REMAINING RISK:

R1: LESS THAN 100 THOUSAND R2: LESS THAN ONE MILLION

R3: LESS THAN 5 MILLION R4: LESS THAN 10 MILLION

R5: NOT LESS THAN 10 MILLION

FIG. 4

AUTHENTICATION SYSTEM

201	202	203	204	205 ₁	205 ₂	206 ₁	206 ₂	206 ₃	207	208
COUNTERMEASURE TYPE	SECURITY COUNTERMEASURE	ASSUMED THREAT	CC FUNCTIONAL REQUIREMENT	LINE OF BUSINESS A CRITERION	LINE OF BUSINESS B CRITERION	AUTHENTICATION SERVER	ENCRYPTION UNIT	ROUTER	FACILITY	OPERATION
MANAGEMENT OF AN AUTHENTICATION LICENSE	SET THE EXPIRATION DATE OF AN AUTHENTICATION LICENSE	ILLEGAL USE	FMT_SAE.1 FMT_MSA.1			L1.C3.R4				
MANAGEMENT OF AN AUTHENTICATION LICENSE	IDENTIFY AND AUTHENTICATE A PERSON BEFORE NULLIFYING AN AUTHENTICATION LICENSE	ILLEGAL USE	FIA_UID.2 FIA_UAU.1			L2.C3.R4	L1.C3.R4			
...
MANAGEMENT OF A KEY	RECORD AN ACCESS TO A KEY WHICH IS NOT ALLOWED IN AN AUDIT TRAIL	ILLEGAL USE	FAU_GEN.1 FAU_SAR.1 FAU_SAR.3			L2.C3.R5	L1.C3.R5	L3.C3.R5		
...
COUNTERMEASURE AGAINST AN INTRUDER	MAKE A FIRE WALL AT A POINT CONNECTED TO AN EXTERNAL NETWORK	LEAKAGE OF INFORMATION							L1.C4.R5	
...
MANAGEMENT OF THE COMING AND GOING OF A PERSON INTO AND OUT OF A ROOM	QUICKLY CHANGE AND RETRIEVE A LICENSE IN RESPONSE TO A CHANGE IN QUALIFICATION	DESTRUCTION OF COMPONENT								L2.C4.R5
...

SECURITY LEVEL: L1: NORMAL, L2: STRONG, L3: STRONGEST

ANNUAL COST REQUIRED: C1: LESS THAN 100 THOUSAND C2: LESS THAN ONE MILLION C3: LESS THAN 5 MILLION C4: LESS THAN 10 MILLION C5: NOT LESS THAN 10 MILLION

ANNUAL REMAINING RISK: R1: LESS THAN 100 THOUSAND R2: LESS THAN ONE MILLION R3: LESS THAN 5 MILLION R4: LESS THAN 10 MILLION R5: NOT LESS THAN 10 MILLION

FIG. 5

FIG. 5

PLANT SYSTEM	201	202	203	204	205 ₁	205 ₂	206 ₁	206 ₂	206 ₃	207	208
	COUNTERMEASURE TYPE	SECURITY COUNTERMEASURE	ASSUMED THREAT	CC FUNCTIONAL REQUIREMENT	LINE OF BUSINESS A CRITERION	LINE OF BUSINESS B CRITERION	CONTROL UNIT	MANAGE- MENT UNIT	FIRE WALL	FACILITY OPERATION	
	MANAGEMENT OF THE AUTHORIZATION OF OPERATING A PLANT	IDENTIFY AND AUTHENTICATE A PERSON BEFORE OPERATING A PLANT	ILLEGAL USE	FIA_UID.2 FMT_UAU.1			L2.C3.R4	L1.C3.R4	L1.C3.R4		
	MANAGEMENT OF THE AUTHORIZATION OF OPERATING A PLANT	GRANT A PRIVILEGE TO A USER IN CONSIDERATION OF A TECHNICAL LEVEL	ILLEGAL USE	FMT_MSA.1						L1.C3.R4	
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
	MONITORING THE OPERATION OF A PLANT	RECORD AN OPERATION WHICH IS NOT ALLOWED IN AN AUDIT TRAIL	ILLEGAL USE	FAU_GEN.1 FAU_SAR.1 FAU_SAR.3			L2.C3.R5	L1.C3.R5	L3.C3.R5		
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
	COUNTERMEASURE AGAINST AN INTRUDER	MAKE A FIRE WALL AT A POINT CONNECTED TO AN EXTERNAL NETWORK	LEAKAGE OF INFORMATION						L1.C4.R5		
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
	MANAGEMENT OF THE COMING AND GOING OF A PERSON INTO AND OUT OF A ROOM	SET A LEVEL FOR THE MANAGEMENT OF THE COMING OF A PERSON INTO A ROOM	DESTRUCTION OF COMPONENT							L2.C4.R5	
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
	SECURITY LEVEL:	ANNUAL COST REQUIRED:	ANNUAL REMAINING RISK:								
	L1: NORMAL, L2: STRONG, L3: STRONGEST	C1: LESS THAN 100 THOUSAND C2: LESS THAN ONE MILLION C3: LESS THAN 5 MILLION C4: LESS THAN 10 MILLION C5: NOT LESS THAN 10 MILLION	R1: LESS THAN 100 THOUSAND R2: LESS THAN ONE MILLION R3: LESS THAN 5 MILLION R4: LESS THAN 10 MILLION R5: NOT LESS THAN 10 MILLION								

FIG. 6

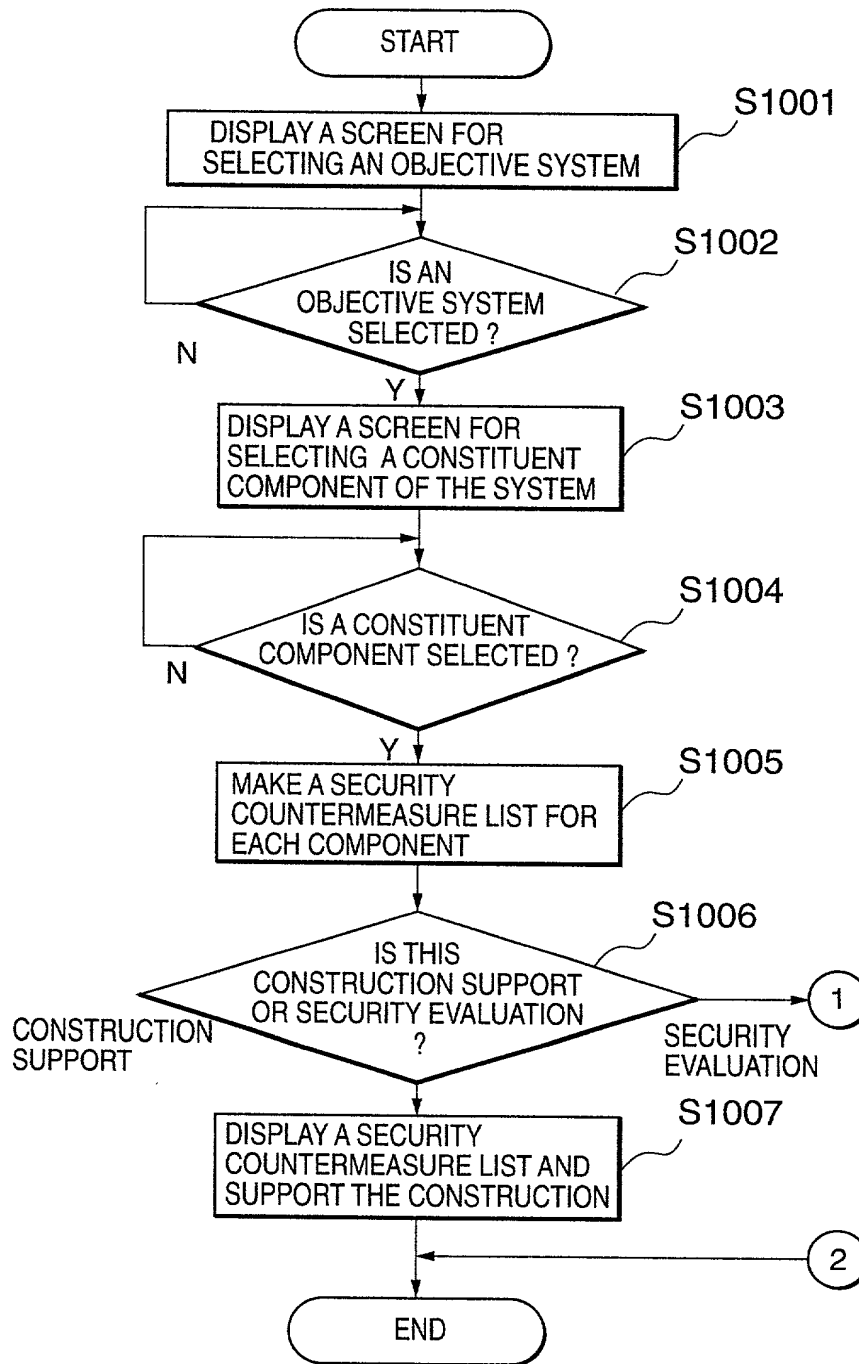


FIG. 7

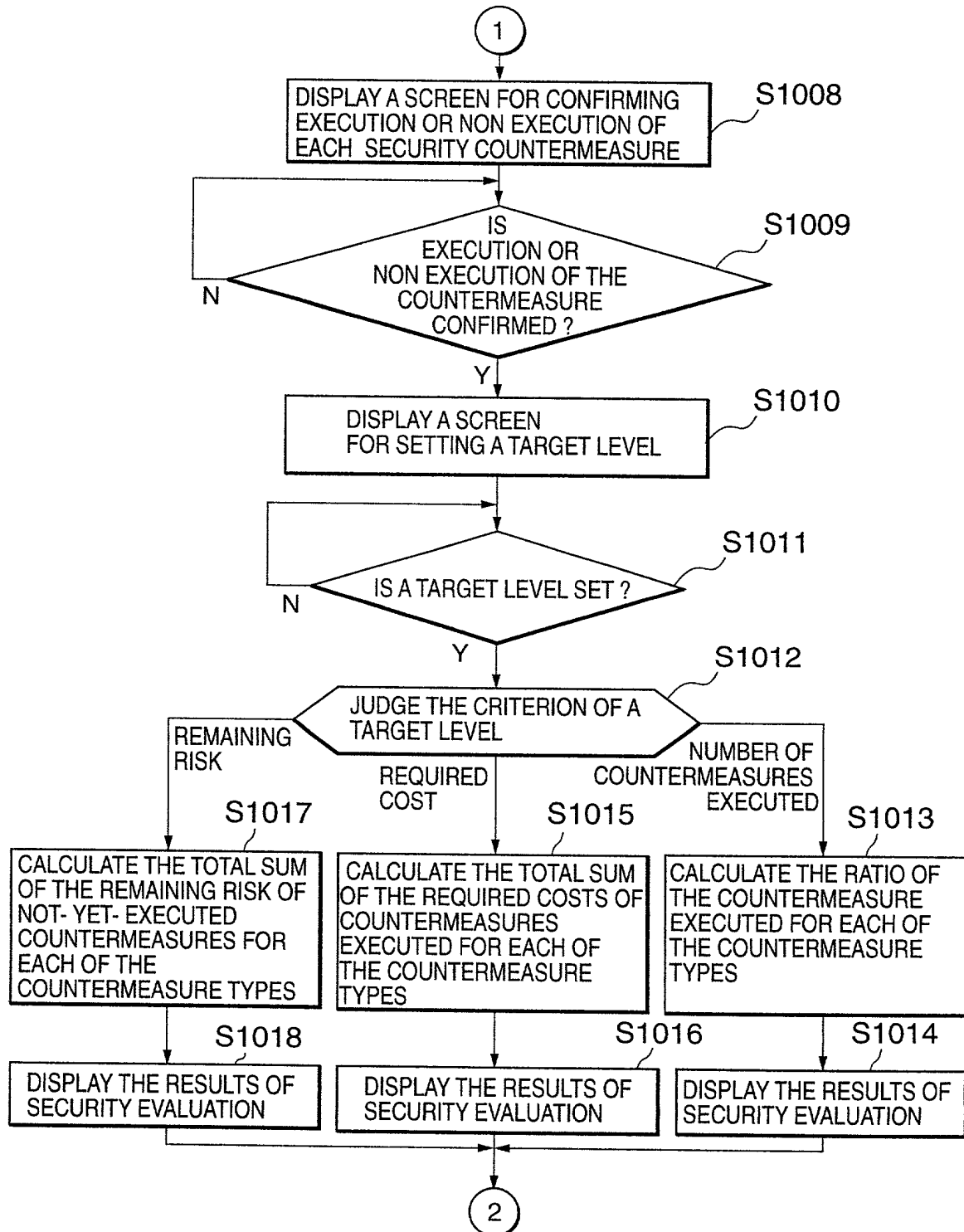
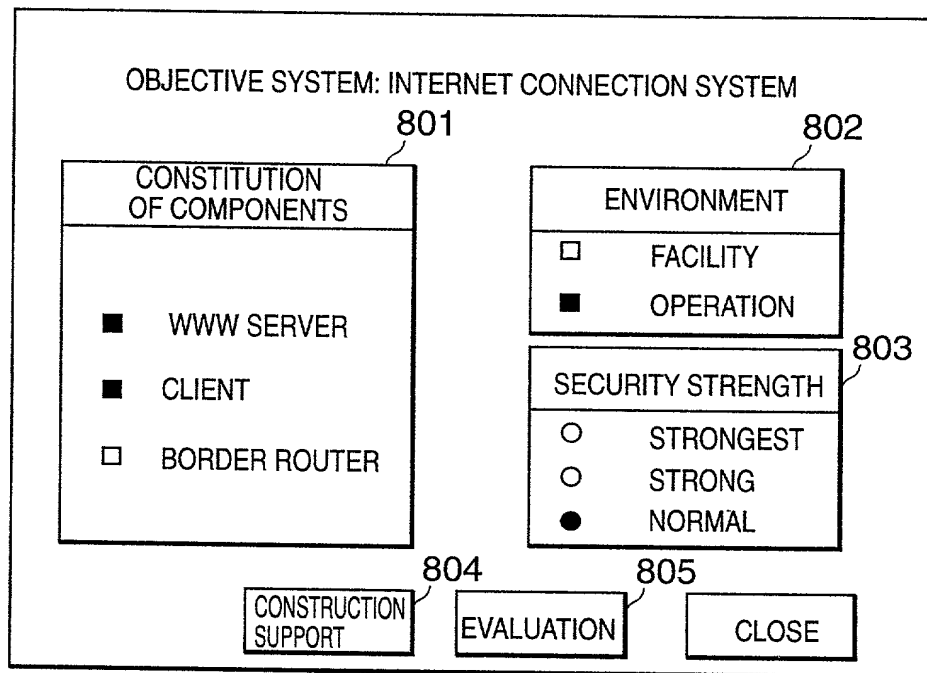


FIG. 9



00220" 80T82980

FIG. 10

10/21

901 OBJECTIVE SYSTEM: INTERNET CONNECTION SYSTEM

WWW SERVER

CLIENT

OPERATION

COUNTERMEASURE TYPE	SECURITY COUNTERMEASURE	ASSUMED THREAT	CC FUNCTIONAL REQUIREMENT	LINE OF BUSINESS A CRITERION	LINE OF BUSINESS B CRITERION	REQUIRED COSTS	REMAINING RISK
MANAGEMENT OF AN ACCESS AUTHORIZATION	LIMIT AN ACCESS TO A PRIVILEGED USER	LEAKAGE OF INFORMATION	FDP_ACF.1 FDP_ACC.2 FIA_UAU.1	◎		LESS THAN ONE MILLION	LESS THAN 5 MILLION
MANAGEMENT OF AN ACCESS AUTHORIZATION	LIMIT A PERSON CAPABLE OF USING A MANAGEMENT UTILITY	LEAKAGE OF INFORMATION	FDP_ACC.2 FDP_ACP.1			LESS THAN 100 THOUSAND	LESS THAN 5 MILLION
...
IDENTIFICATION AND AUTHENTICATION	DO NOT DISPLAY VARIOUS KINDS OF INFORMATION WHEN AN AUTHENTICATION IS NOT SUCCESSFUL	ILLEGAL USE	FIA_AFL.1 FIA_UAU.7			LESS THAN 100 THOUSAND	LESS THAN 5 MILLION
...

902

903

SAVE

PRINT

CLOSE

FIG. 11

901 OBJECTIVE SYSTEM: INTERNET CONNECTION SYSTEM

WWW SERVER

CLIENT

OPERATION

904

COUNTERMEASURE TYPE	SECURITY COUNTERMEASURE	ASSUMED THREAT	CC FUNCTIONAL REQUIREMENT	LINE OF BUSINESS A CRITERION	LINE OF BUSINESS B CRITERION	REQUIRED COSTS	REMAINING RISK	BOX FOR CHECKING TO INDICATE EXECUTION
MANAGEMENT OF AN ACCESS AUTHORIZATION	LIMIT AN ACCESS TO A PRIVILEGED USER	LEAKAGE OF INFORMATION	FDP_ACP.1 FDP_ACC.2 FIA_UAU.1	◎		LESS THAN ONE MILLION	LESS THAN 5 MILLION	>
MANAGEMENT OF AN ACCESS AUTHORIZATION	LIMIT A PERSON CAPABLE OF USING A MANAGEMENT UTILITY	LEAKAGE OF INFORMATION	FDP_ACC.2 FDP_ACF.1			LESS THAN 100 THOUSAND	LESS THAN 5 MILLION	>
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
IDENTIFICATION AND AUTHENTICATION	DO NOT DISPLAY VARIOUS KINDS OF INFORMATION WHEN AN AUTHENTICATION IS NOT SUCCESSFUL	ILLEGAL USE	FIA_AFL.1 FIA_UAU.7			LESS THAN 100 THOUSAND	LESS THAN 5 MILLION	>
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	

EXECUTE

RESET

CLOSE

905

906

SETTING OF TARGET LEVEL

<p><input checked="" type="radio"/> NUMBER OF EXECUTED SECURITY COUNTERMEASURE</p> <p>TARGET VALUE <input style="width: 50px; text-align: center;" type="text" value="80"/> % OR MORE</p>	<p><input type="radio"/> LINE OF BUSINESS A CRITERION</p> <p><input type="radio"/> LINE OF BUSINESS B CRITERION</p>
<p><input type="radio"/> REQUIRED COST TARGET VALUE < <input style="width: 80px;" type="text"/> MILLION YEN / YEAR</p>	
<p><input type="radio"/> REMAINING RISK TARGET VALUE < <input style="width: 80px;" type="text"/> MILLION YEN / YEAR</p>	

FIG. 15

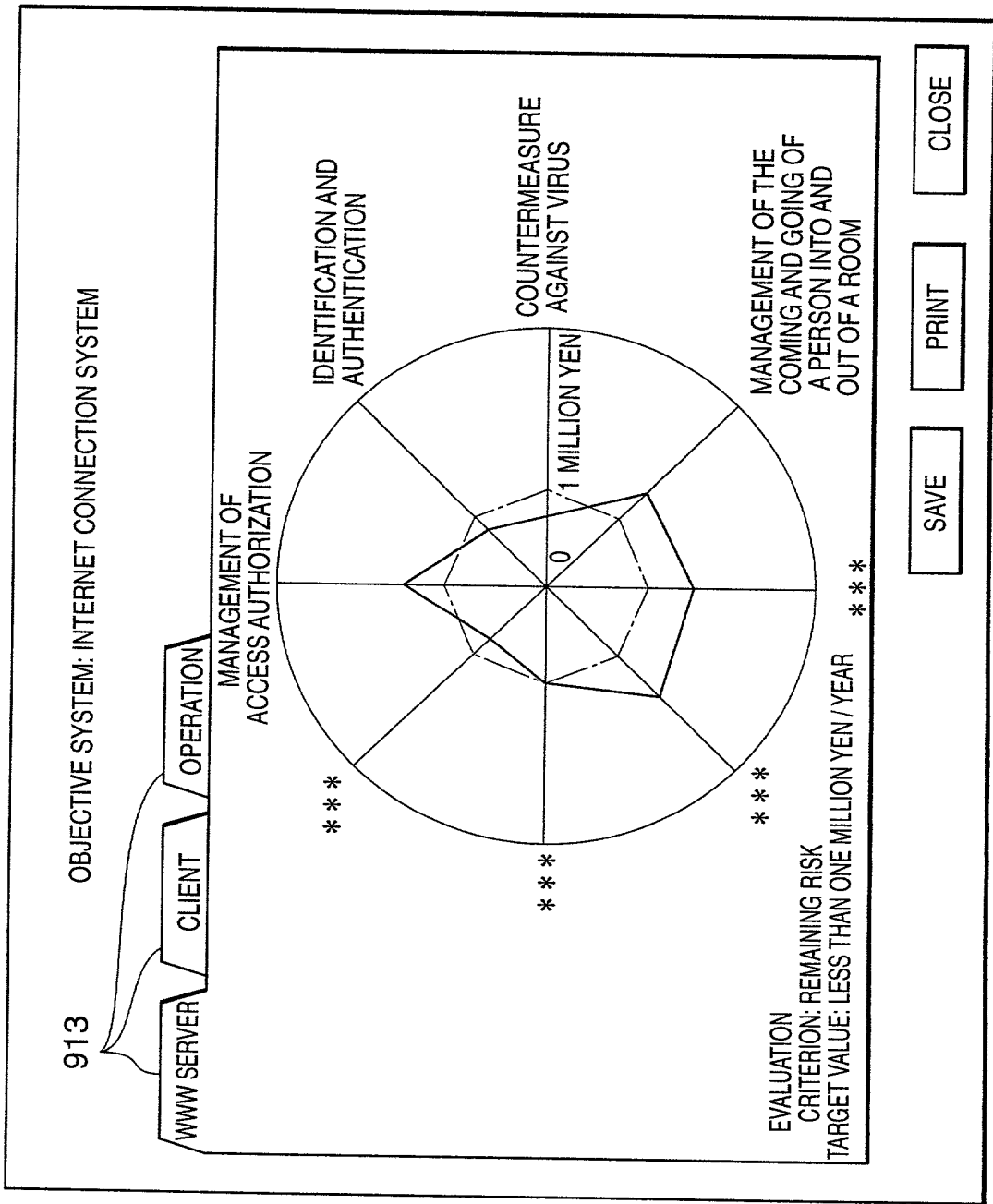


FIG. 17

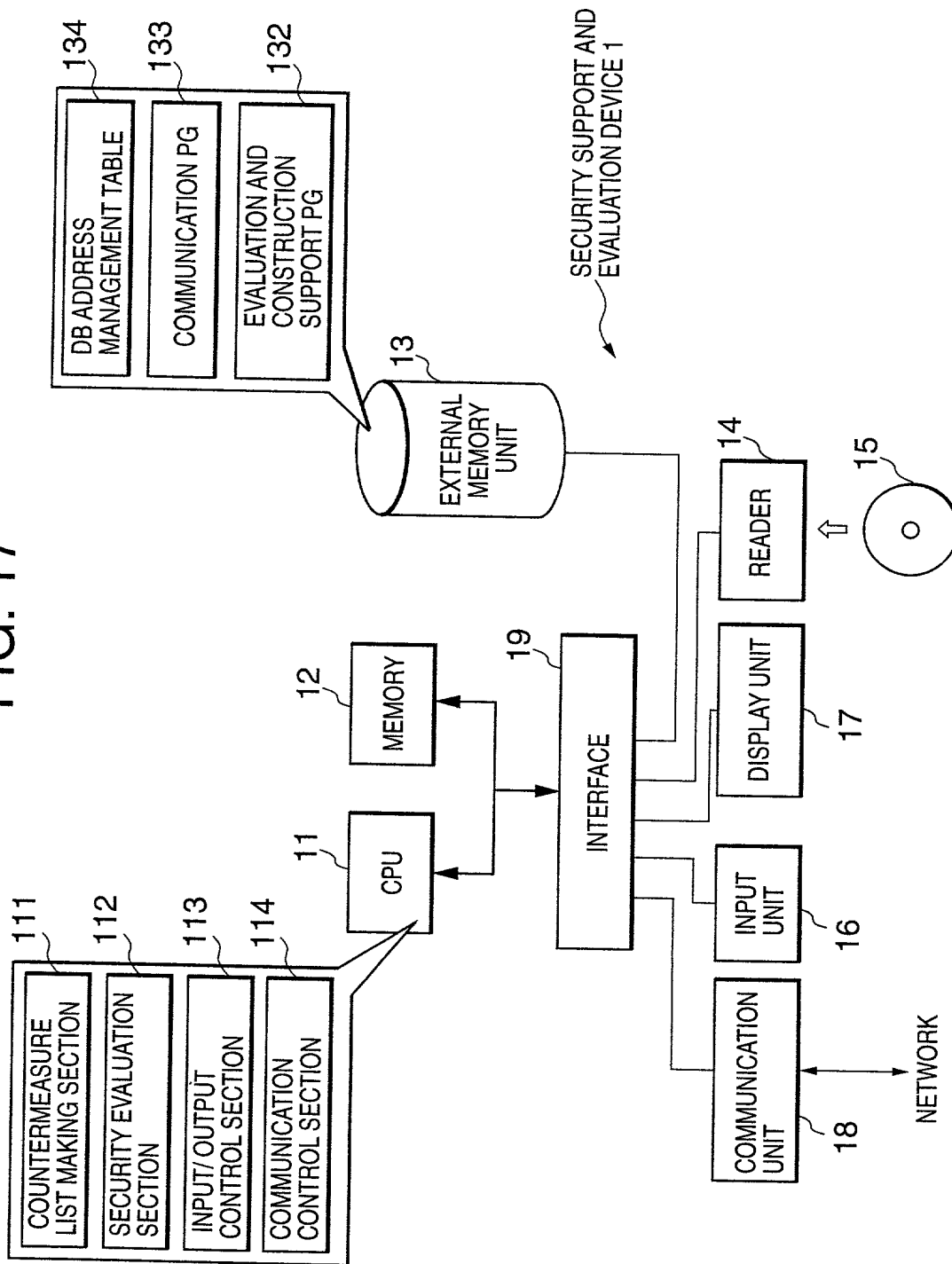


FIG. 18

COUNTERMEASURE DB (OBJECTIVE SYSTEM)	DB MANAGEMENT UNIT ADDRESS
COUNTERMEASURE DB ₁ (INTERNET CONNECTION SYSTEM)	****,****,**,**
COUNTERMEASURE DB ₂ (AUTHENTICATION SYSTEM)	****,****,**,**
COUNTERMEASURE DB ₃ (PLANT SYSTEM)	****,****,**,**
⋮	⋮
COUNTERMEASURE DB _n (*** SYSTEM)	****,****,**,**

FIG. 19

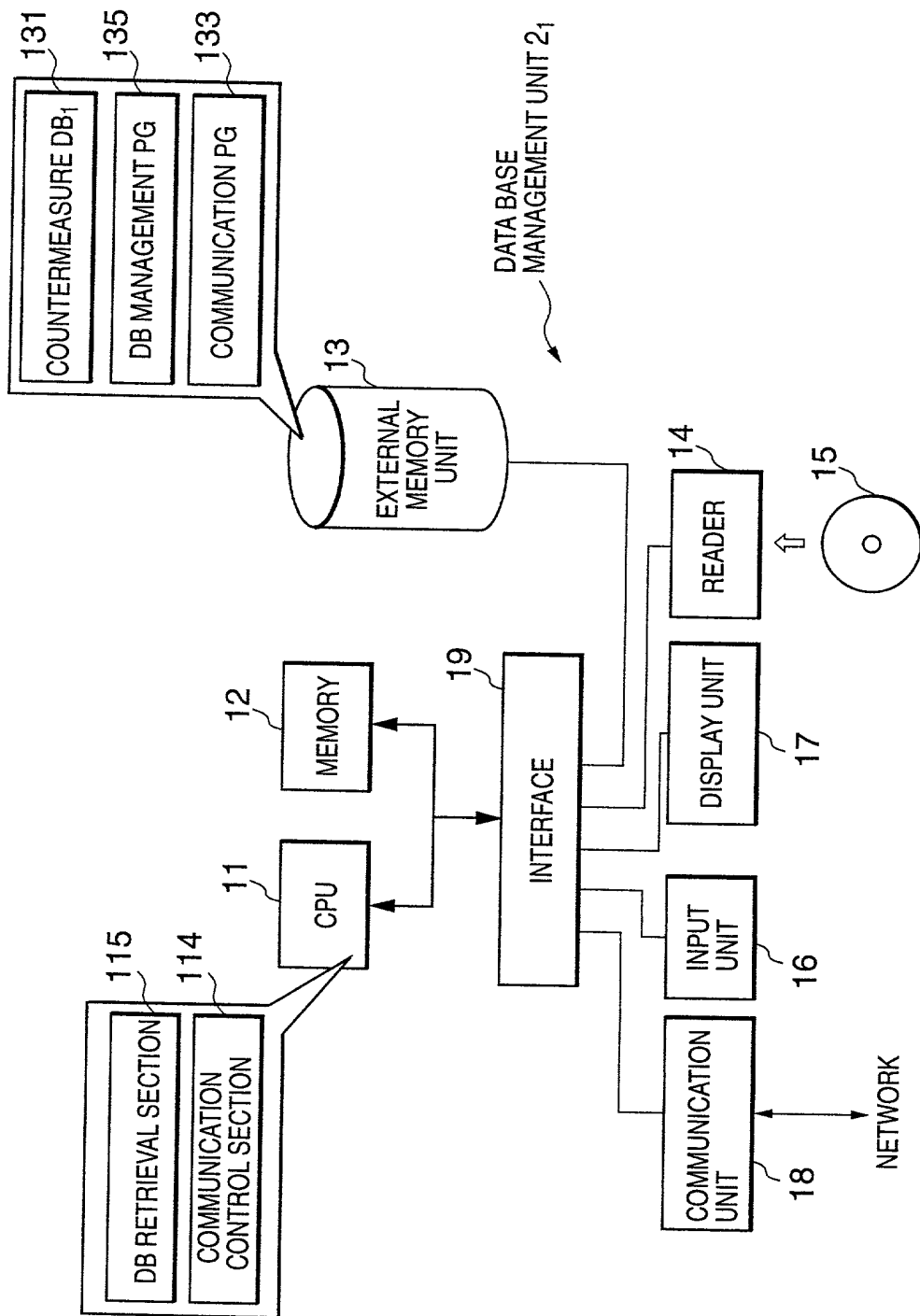


FIG. 20

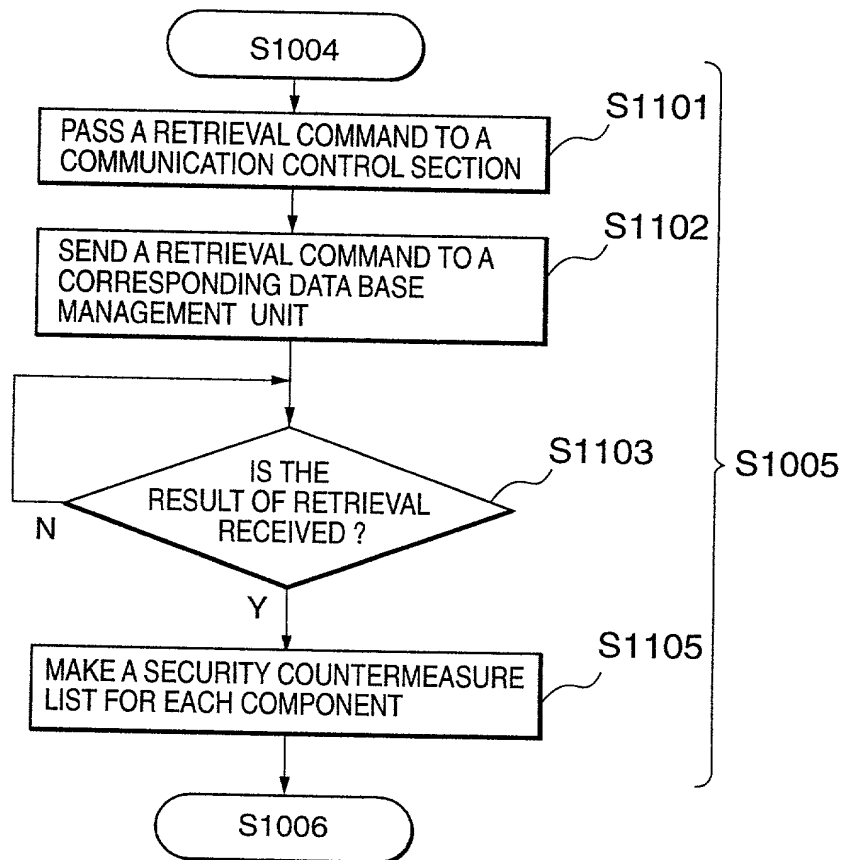


FIG. 21

